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# 3 General maintenance and repair

Most modern electronic locomotives have components that perform similar functions and share similar designs. MTH fan-assisted smoke units are similar to fan-assisted units in Lionel, K-Line, and Atlas O locomotives. Electrically operated couplers, pickup rollers, can-style motors, lighting systems, and tethers that connect steam locomotives to tenders all share common design elements, regardless of brand.

This chapter focuses on repair information common to all modern O gauge steam, diesel, or electric-profile locomotives. Covered in this chapter are sound systems, electrocouplers or coil-fired couplers, fan-assisted smoke generators, pickup rollers and wiring, direct-current can-style motors, drive systems, lighting, and tethers that connect tenders or dummy diesel units to powered units.

Components and systems unique to specific manufacturers are covered in chapters 4, 5, and 6.

## 3.1 Sound systems

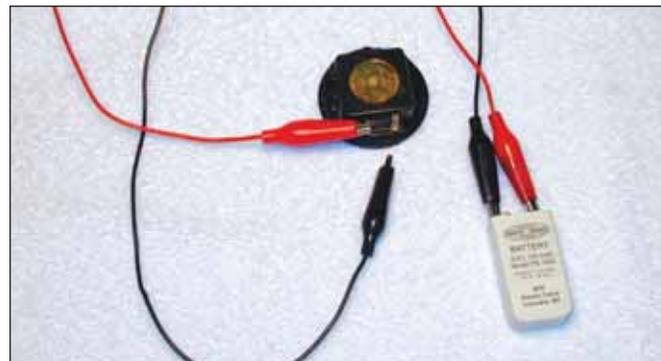
Sound is one of the signature features of modern electronic locomotives. Passenger station sounds, freight-loading sounds, horns, whistles, bells, diesel-engine sounds, and of course steam-locomotive chuffing sounds have made O gauge model railroading a lot more fun. Sound is one of the main reasons that more owners are operating their trains instead of just displaying them on shelves.

While many modern locomotives have full-fledged sound systems that can be used in a conventional-control or a command-control environment, others feature basic horns, bells, and whistles but no diesel roar or steam-chuff sounds.

### How to test your sound system

When something goes wrong with a sound system, it's obvious. The key to repairing a sound system quickly involves identifying the system's components and testing each component one at a time.

The three key elements of a sound system are the volume-control mechanism, speaker, and circuit boards.



Checking for a bad speaker is easy using alligator-clip test wires and a battery.

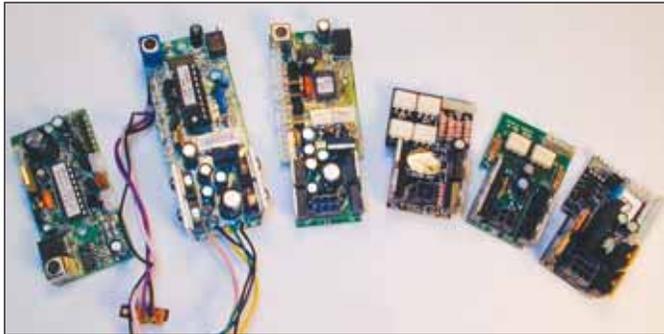
### Checking your volume control

If there is no sound whatsoever, first check that the sound-volume knob or dial is not mistakenly turned all the way down. Your locomotive instruction manual will show you where the sound-control knob is located. It is usually located underneath the locomotive on the frame, but in the latest models, the knob has been moved topside, often beneath a discreet hatch. Topside knobs allow you to change volume without removing the locomotive from the track. Here's what to do:

1. If the sound-adjustment knob on your locomotive is recessed, you may need a small jeweler-style screwdriver to move it. Otherwise, turn it with your fingers. Don't force the knob; it is not designed to move in a full circle. If you are unsure whether to move it to the left or right to increase volume, set it in the middle. Then, if all is working properly, you'll hear sounds, just not at full volume.
2. If there is still no sound, remove the shell of the locomotive (or, in the case of steam locomotives, the tender) and make sure that the wires are attached to the volume-control mechanism and connected to the sound circuit board.
3. When operating in command-control mode, sound volume can be adjusted electronically. Be sure to turn up the sound (press auxiliary 1, then button 1) on your Lionel CAB-1 controller. MTH's DCS controller offers a sound menu. The volume for horn, whistle, and bell sounds, steam and diesel sounds, and special-effect sounds can all be raised or lowered independently.

In my experience, volume-control mechanisms seldom go bad. If the problem ultimately proves to be in the volume-control mechanism, it will need to be replaced.

There are many versions of TMCC control circuit boards.

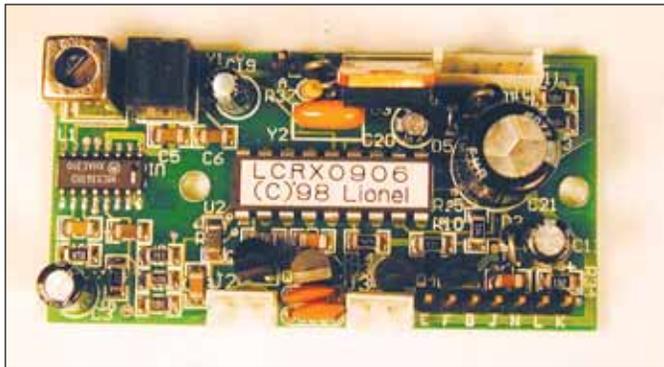


### LCRX control circuit boards

The LCRX control circuit board is a basic circuit board that is used when TMCC control is needed but an electric motor is not present. An example of this is a dummy A or B unit without motors but with an electrocoupler, directional lighting, or RailSounds. LCRX boards can control front and rear lights, front and rear couplers, and RailSounds. The board has a built-in antenna receiver.

The LCRX control circuit board hasn't been used in large quantities, so I don't see many in my service station repair work. However, I do use these circuit boards frequently when customers ask me to upgrade dummy diesel units to include TMCC functions.

The LCRX circuit board provides coupler, lights, and sound control, but it will not operate motors.



If your locomotive uses an LCRX circuit board but it is not responding to CAB-1 commands, first check the pickup rollers and wiring (see section 3.4 on page 33). If everything looks OK, then check the wiring to the various features. Check the light bulbs (section 3.7 on page 48), couplers (section 3.2 on page 25), and sound system (section 3.1 on page 22).

Also make sure the antenna is properly connected to the circuit board. If your locomotive remains non-responsive, re-program the circuit board as described near the end of this chapter on page 74.

As a last resort, if you have a good spare circuit board, install it to verify that the original circuit board is the problem. If you're still stuck, you'll need to take your locomotive to a service center.

### LCRU and LCRU2 motor-driver circuit boards

Two versions exist of the LCRU circuit board, both of which were used in early TMCC locomotives built in the mid-1990s. They are designed to control one or two AC Pullmor motors, front and rear lights, front and rear couplers, and RailSounds. The later version (LCRU2) uses multi-pin plugs instead of soldered wires, and it also supports a strobe-light feature that Lionel used in the 1990s. Both versions have antenna receivers built into the circuit board.

In my repair work, I've had to replace many LCRU and LCRU2 circuit boards. They were made in large quantities and, in hindsight, the circuit boards may have been asked to operate too many features. The LCRU was produced first, and was later redesigned as the LCRU2.

The most common failure I see is in the radio receiver. If you have a locomotive with a questionable LCRU circuit board, check the locomotive in conventional-control mode first (don't



Both versions of the LCRU circuit board were used in large quantities.